

IN THE CLAIMS:

1. (previously presented) An ultrasonic motor comprising:

a vibrating body;

a piezoelectric element disposed on the vibrating body for generating a vibration wave to vibrate the vibrating body, the vibration wave having a vibration node disposed on a diagonal line of the vibrating body, the piezoelectric element having four areas divided by two lines each connecting centers of a first pair of opposite sides and centers of a second pair of opposite sides, respectively, of the vibrating body, each of the four areas having an electrode portion;

at least one protrusion connected to the vibrating body for vibration therewith, the protrusion being disposed on the vibrating body at a position which does not correspond to the position of the vibration node; and

a moving body disposed in contact with and driven by the protrusion during vibration thereof.

2. (previously presented) An ultrasonic motor comprising:

a vibrating body;

a piezoelectric element having four areas each having an electrode portion and divided by two diagonal lines of the vibrating body, the piezoelectric element being

disposed on the vibrating body for generating a vibration wave to vibrate the vibrating body, the vibration wave having a vibration node disposed on a line connecting a center of a first side of the vibrating body and a center of a second side of the vibrating body opposite to the first side;

at least one protrusion connected to the vibrating body for vibration therewith, the protrusion being disposed on the vibrating body at a position which does not correspond to the position of the vibration node; and

a moving body disposed in contact with and driven by the protrusion during vibration thereof.

3. (previously presented) An ultrasonic motor according to claim 1; wherein the at least one protrusion comprises two protrusions disposed symmetrically about a center of the vibrating body.

4.-5. (canceled)

6. (previously presented) An ultrasonic motor according to claim 1; further comprising a support member for supporting the vibrating body at a center thereof.

7. (previously presented) An ultrasonic motor comprising:

a vibrating body;

a piezoelectric element disposed on the vibrating body for generating a vibration wave to vibrate the vibrating

body, the vibration wave having a vibration node disposed on a diagonal line of the vibrating body;

at least one protrusion connected to the vibrating body for vibration therewith, the protrusion being disposed on the vibrating body at a position which does not correspond to the position of the vibration node;

a moving body disposed in contact with and driven by the protrusion during vibration thereof; and

a support member for supporting the vibrating body along the diagonal line thereof.

8. (previously presented) An ultrasonic motor comprising:

a vibrating body;

a piezoelectric element disposed on the vibrating body for generating a vibration wave to vibrate the vibrating body, the vibration wave having a vibration node disposed on a diagonal line of the vibrating body;

at least one protrusion connected to the vibrating body for vibration therewith, the protrusion being disposed on the vibrating body at a position which does not correspond to the position of the vibration node;

a moving body disposed in contact with and driven by the protrusion during vibration thereof; and

a support member for supporting at least two corners of the vibrating body along the diagonal line thereof.

9. (previously presented) An ultrasonic motor comprising:

a vibrating body;

a piezoelectric element disposed on the vibrating body for generating a vibration wave to vibrate the vibrating body, the vibration wave having a vibration node disposed on a diagonal line of the vibrating body;

at least one protrusion connected to the vibrating body for vibration therewith, the protrusion being disposed on the vibrating body at a position which does not correspond to the position of the vibration node;

a moving body disposed in contact with and driven by the protrusion during vibration thereof; and

a support member for supporting the vibrating body along a line connecting a center of a first side of the vibrating body and a center of a second side of the vibrating body opposite the first side.

10. (canceled)

11. (previously presented) An ultrasonic motor comprising: a vibrating body; a piezoelectric element disposed on the vibrating body for generating a vibration wave to vibrate the vibrating body, the vibration wave having a vibration node disposed on a diagonal line of the vibrating body; at least one protrusion connected to the vibrating body

for vibration therewith, the protrusion being disposed on the vibrating body at a position which does not correspond to the position of the vibration node; and a moving body disposed in contact with and driven by the protrusion during vibration thereof; wherein the vibrating body has a groove formed in a surface thereof and along the diagonal line.

12. (previously presented) An ultrasonic motor according to claim 1; wherein the vibrating body is driven by applying a drive signal to two of the electrode portions of the piezoelectric element.

13. (canceled)

14. (canceled)

15. (previously presented) An ultrasonic motor comprising: a generally plate-shaped vibrating body; and a piezoelectric element bonded on the vibrating body and having four areas divided by two diagonal lines of the vibrating body and a plurality of polarized portions polarized in the same direction, each area having an electrode portion corresponding to a respective one of the polarized portions; wherein the vibrating body is vibrated by applying drive signals different in phase by 180 degrees to two of the electrode portions.

16. (canceled)

17. (canceled)

18. (previously presented) An electronic apparatus comprising: an ultrasonic motor according to claim 1; a transmission mechanism for transmitting movement of the moving body; and an output mechanism for producing an output motion in accordance with the movement transmitted by the transmission mechanism.

19. (previously presented) An ultrasonic motor according to claim 1; wherein the vibrating body has a quadrilateral shape.

20. (previously presented) An ultrasonic motor according to claim 19; wherein the piezoelectric element has a plurality of electrodes for generating a bending vibration wave in a thickness direction of the vibrating body.

21. (previously presented) An ultrasonic motor according to claim 20; wherein the piezoelectric element has a plurality of polarized portions polarized in the same direction and each corresponding to a respective one of the electrodes.

22. (previously presented) An ultrasonic motor according to claim 20; wherein the plurality of electrodes comprises a plurality of adjacent pairs of electrodes; and wherein the vibrating body is vibrated by applying a driving signal to the pairs of electrodes.

23. (previously presented) An ultrasonic motor according to claim 20; wherein the plurality of electrodes comprises a plurality of pairs of electrodes; and wherein the vibrating body is vibrated by applying a driving signal to the pairs of electrodes.

24. (previously presented) An ultrasonic motor according to claim 1; wherein the piezoelectric element has a plurality of electrodes for generating a bending vibration wave in a thickness direction of the vibrating body.

25. (previously presented) An ultrasonic motor according to claim 2; wherein the vibrating body has a quadrilateral shape.

26. (previously presented) An ultrasonic motor according to claim 2; wherein the piezoelectric element has a plurality of electrodes for generating a bending vibration wave in a thickness direction of the vibrating body.

27. (previously presented) An ultrasonic motor according to claim 2; wherein the vibrating body is vibrated by applying a driving signal to two of the electrodes.

28. (canceled)

29. (previously presented) An ultrasonic motor according to claim 2; wherein the piezoelectric element has a plurality of electrodes for generating a bending vibration wave in a thickness direction of the vibrating body and a plurality of polarized portions polarized in the same direction and each corresponding to a respective one of the electrodes.

30. (previously presented) An ultrasonic motor according to claim 2; wherein the plurality of electrodes comprises a plurality of adjacent pairs of electrodes; and wherein the vibrating body is vibrated by applying a driving signal to the pairs of electrodes.

31. (previously presented) An ultrasonic motor according to claim 2; wherein the plurality of electrodes comprises a plurality of pairs of electrodes; and wherein the vibrating body is vibrated by applying a driving signal to the pairs of electrodes.

32. (previously presented) An ultrasonic motor according to claim 2; wherein the piezoelectric element has a plurality of electrodes for generating a bending vibration wave in a thickness direction of the vibrating body.

33. (previously presented) An ultrasonic motor according to claim 2; wherein the at least one protrusion comprises a plurality of protrusions disposed symmetrically about a center of the vibrating body.

34. (previously presented) An ultrasonic motor according to claim 2; further comprising a support member for supporting a center of the vibrating body.

35. (previously presented) An ultrasonic motor comprising:

a vibrating body;

a piezoelectric element disposed on the vibrating body for generating a vibration wave to vibrate the vibrating body, the vibration wave having a vibration node disposed on a line connecting a center of a first side of the vibrating body and a center of a second side of the vibrating body opposite to the first side;

at least one protrusion connected to the vibrating body for vibration therewith, the protrusion being disposed on the vibrating body at a position which does not correspond to the position of the vibration node;

a moving body disposed in contact with and driven by the protrusion during vibration thereof; and

a support member for supporting the vibrating body along a diagonal line of the vibrating body.

36. (previously presented) An ultrasonic motor comprising:

a vibrating body;

a piezoelectric element disposed on the vibrating body for generating a vibration wave to vibrate the vibrating body, the vibration wave having a vibration node disposed on a line connecting a center of a first side of the vibrating body and a center of a second side of the vibrating body opposite to the first side;

at least one protrusion connected to the vibrating body for vibration therewith, the protrusion being disposed on the vibrating body at a position which does not correspond to the position of the vibration node;

a moving body disposed in contact with and driven by the protrusion during vibration thereof; and

a support member for supporting a corner of the vibrating body along a line extending from a diagonal line of the vibrating body.

37. (canceled)

38. (previously presented) An ultrasonic motor comprising:

a vibrating body;

a piezoelectric element disposed on the vibrating body for generating a vibration wave to vibrate the vibrating

body, the vibration wave having a vibration node disposed on a line connecting a center of a first side of the vibrating body and a center of a second side of the vibrating body opposite to the first side;

at least one protrusion connected to the vibrating body for vibration therewith, the protrusion being disposed on the vibrating body at a position which does not correspond to the position of the vibration node; and

a moving body disposed in contact with and driven by the protrusion during vibration thereof;

wherein the vibrating body has a groove formed in a surface thereof and along a line on which the vibration node extends.

39. (previously presented) An electronic apparatus comprising: an ultrasonic motor according to claim 2; a transmission mechanism for transmitting movement of the moving body; and an output mechanism for producing an output motion in accordance with the movement transmitted by the transmission mechanism.

40. (canceled)

41. (previously presented) An ultrasonic motor according to claim 1; wherein the piezoelectric element has a plurality of electrodes for generating a bending vibration wave in a thickness direction of the vibrating body and a

plurality of polarized portions polarized in the same direction and each corresponding to a respective one of the electrodes.

42. (previously presented) An ultrasonic motor comprising:

a vibrating body;

a piezoelectric element disposed on the vibrating body for generating a vibration wave to vibrate the vibrating body, the vibration wave having a vibration node disposed on a line connecting a center of a first side of the vibrating body and a center of a second side of the vibrating body opposite the first side, the piezoelectric element having four areas divided by two lines each connecting centers of a first pair of opposite sides and centers of a second pair of opposite sides, respectively, of the vibrating body, each of the four areas having an electrode portion;

at least one protrusion connected to the vibrating body for vibration therewith, the protrusion being disposed on the vibrating body at a position which does not correspond to the position of the vibration node; and

a moving body disposed in contact with and driven by the protrusion during vibration thereof.

43. (previously presented) An ultrasonic motor comprising:

a vibrating body;

a piezoelectric element having four areas each having an electrode portion and divided by two diagonal lines of the vibrating body, the piezoelectric element being disposed on the vibrating body for generating a vibration wave to vibrate the vibrating body, the vibration wave having a vibration node disposed on a diagonal line of the vibrating body;

at least one protrusion connected to the vibrating body for vibration therewith, the protrusion being disposed on the vibrating body at a position which does not correspond to the position of the vibration node; and

a moving body disposed in contact with and driven by the protrusion during vibration thereof.